9. The probe of claim 1, said nucleic acid probe being labeled with a label selected from the group consisting of fluorochrome-responsive labels, fluorochromes, colorimetric chemical, conjugated proteins, antibodies, antigens, and mixtures thereof.

10. The probe of claim 9, said nucleic acid probe being labeled with a fluorochrome-responsive label.

11. The probe of claim 1, there being at least about 80% sequence identity between said probe and a sequence which is a complement to said target sequence.

12. The probe of claim 11, said probe being complementary to said target sequence.

13. In a hybridization method including the steps of preparing a reaction mixture comprising a target nucleic acid sequence and a nucleic acid probe which hybridizes to at least a portion of said target nucleic acid sequence, and causing said probe to hybridize to said target nucleic acid sequence, the improvement which comprises using as said probe a labeled, single copy nucleic acid which hybridizes to a deduced single copy sequence interval in target nucleic acid of known sequence, said nucleic acid probe having a length of at least about 50 nucleotides.

14. The method of claim 13, said probe including a plurality of different, labeled nucleic acids each of which hybridizes to respective deduced single copy sequence intervals in said target nucleic acid, each of said nucleic acid probes having a length of at least about 50 nucleotides.

15. The method of claim 13, said nucleic acid probe having a length of at least 100 nucleotides.

16. The method of claim 15, said nucleic acid probe having a length of at least about 2000 nucleotides.

17. The method of claim 13, said target nucleic acid being selected from the group consisting of DNA, RNA and mRNA.

18. The method of claim 17, said target nucleic acid being DNA.

19. The method of claim 13, said nucleic acid probe being single stranded.

20. The method of claim 13, said probe being essentially free of blocking nucleic acid sequences which hybridizes repeat sequences within the genome of which said target nucleic acid is a part.

21. The method of claim 13, said nucleic acid probe being labeled with a label selected from the group consisting of fluorochrome-responsive labels, fluorochromes, colorimetric chemical, conjugated proteins, antibodies, antigens, and mixtures thereof.

22. The method of claim 21, said nucleic acid probe being labeled with a fluorochrome-responsive label.

23. The method of claim 13, said hybridization method selected from the group consisting of *in situ* hybridization, Southern blot, and other methods in which nucleic acid is immobilized.

24. The method of claim 13, there being at least about 80% sequence identity between said probe and a sequence which is a complement to said target sequence.

25. The method of claim 24, said probe being complementary to said target sequence.

26. A method of developing a hybridization probe for a target nucleic acid sequence forming a part of a genome, said method comprising the steps of:

determining the sequence of at least one single copy sequence in said target nucleic acid sequence; and

developing a hybridization probe which hybridizes to at least a part of said single copy sequence.

27. The method of claim 26, including the steps of:

determining the sequence of said target nucleic acid sequence;

determining the repeat sequences found in said genome; and

comparing said sequence of said target nucleic acid sequence and said repeat sequences in order to determine said sequence of said at least one single copy sequence.

28. The method of claim 26, said probe developing step comprising the steps of obtaining at least a part of said single copy sequence, and purifying said part of said single copy sequence.

29. The method of claim 28, said purifying step comprising carrying out PCR.

30. The method of claim 26, including the step of labeling said hybridization probe.

31. The method of claim 26, target nucleic acid sequence and said probe being DNA.

32. The method of claim 26, said hybridization probe having at least about 80% sequence identity with said single copy sequence.

33. The method of claim 32, said hybridization probe being complementary to single copy sequence.

34. A DNA sequence having at least about 80% sequence identity with a member selected from the group consisting of SEQ ID Nos. 429-446.

35. The DNA sequence of claim 34, said sequence having at least about 90% sequence identity.

36. A DNA sequence selected from the group consisting of SEQ ID Nos. 429-446 and 480-613.

37. A DNA sequence having at least about 80% sequence identity with a PCR-amplified sequence produced using as PCR primers adjacent pairs of the sequences identified as SEQ ID Nos. 429-446 and 480-613, beginning with SEQ ID No. 429.

38. The sequence of claim 37, there being at least about 90% sequence identity.

39. A method of determining the existence of previously unknown repeat sequence families in a genome, comprising the steps of reacting a labeled, putative single copy nucleic acid probe with the genome, causing the probe to hybridize, and ascertaining if the probe hybridizes to the genome at more than three different locations as a determination of a new repeat sequence family.

40. The method of claim 39, including the step of ascertaining if the probe hybridizes at more than ten different locations.

41. The probe of claim 1, said nucleic acid derived from a duplicon or triplicon sequence interval.

42. The method of claim 13, including the step of selecting a single copy nucleic acid which will hybridize to a duplicon or triplicon sequence domain.

43. The method of claim 26, said determining step comprising the step of selecting said single copy sequence from a duplicon or triplicon sequence domain.

44. A method of determining a chromosome breakpoint, comprising the steps of:

providing a pair of separate, labeled, single copy nucleic acid probes of predetermined sequence and designed to respectively hybridize on opposite sides of said breakpoint;

reacting said pair of probes with a chromosomal target sequence containing said breakpoint, and causing the probes to hybridize to the target sequence; and

detecting said hybridized probes as a way of ascertaining the location of said breakpoint.

45. The method of claim 44, including the step of providing a plurality of separate, labeled, single copy nucleic acid probes of predetermined sequence designed to hybridize on one side of said breakpoint, and providing a plurality of separate, labeled, single copy nucleic acid probes of predetermined sequence designed to hybridize on the other side of said breakpoint.